



Title: RETRACTABLE TERRACE CANOPY

5 Inventors: Gary D. Childres  
Stuart D. Dwork

#### TECHNICAL FIELD OF THE INVENTION

The present invention relates to an improved awning  
10 structure.

#### BACKGROUND OF THE INVENTION

Conventional retractable awnings suffer from a number  
of deficiencies. Conventional retractable awnings are  
15 typically cumbersome, as well as very time consuming, to  
deploy from their stowed state. The present invention  
provides for a retractable awning that may be extended or  
retracted easily and quickly.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the apparatus of the present invention may be obtained by reference to the following Detailed Description when taken in conjunction with the accompanying Drawings wherein:

FIGURE 1 illustrates a perspective view of an awning assembly in accordance with an embodiment of the present invention;

FIGURE 2 illustrates a plan view of the frame assembly of the awning assembly 10 of FIGURE 1;

FIGURE 3A illustrates an embodiment of the roller tube 20 of FIGURE 1;

FIGURE 3B illustrates another embodiment of the roller tube 20 of FIGURE 1;

FIGURE 3C illustrates an alternate embodiment of the roller tube assembly 18 of FIGURE 1;

FIGURE 4 illustrates an embodiment of the front bar 30a of FIGURE 1;

FIGURE 5A illustrates a front view of an embodiment of the first glide block 24a of FIGURE 1;

FIGURE 5B illustrates a side view of an embodiment of the first glide block 24a of FIGURE 1;

FIGURE 5C illustrates a top view of an embodiment of the first glide block 24a of FIGURE 1;

5       FIGURE 6A illustrates a side view of the awning assembly 10 of FIGURE 1 in a fully retracted position;

FIGURE 6B illustrates a side view of the awning assembly 10 of FIGURE 1 in a partially extended position;

FIGURE 6C illustrates the awning assembly 10 of FIGURE 10   1 in a fully extended position;

FIGURE 7A illustrates a perspective view of a portion of the awning assembly 10 of FIGURE 1;

FIGURE 7B illustrates another perspective view of a portion of the awning assembly 10 of FIGURE 1;

15       FIGURE 7C illustrates still another perspective view of a portion of the awning assembly 10;

FIGURE 8 illustrates an embodiment of the present invention having an integrated misting device;

FIGURE 9 illustrates an embodiment of the present invention in which the awning assembly 10 is affixed to a table 70; and

20

FIGURE 10 illustrates a perspective view of an awning assembly 110 having a single canopy in accordance with another embodiment of the present invention.

5 DETAILED DESCRIPTION OF THE INVENTION

Reference is now made to the Drawings wherein like reference characters denote like or similar parts throughout the various Figures. Referring now to FIGURE 1, a perspective view of an awning assembly in accordance with an embodiment of the present invention is illustrated. The awning assembly 10 illustrated in FIGURE 1 includes a frame assembly comprised of a first support leg 12a and a second support leg 12b attached to and supporting a horizontal truss brace 14. Although not required, a first curved truss brace 15a and a second curved truss brace 15b may be further attached between the first support leg 12a and the horizontal truss brace 14, and the second support leg 12b and the second curved truss brace 15b, respectively, to provide additional support. A first base plate 16a may be attached to the first support leg 12a and a second base plate 16b may be attached to the second support leg 12b in

order to provide increased stability to the awning assembly 10. In one embodiment, the first base plate 16a can further be provided with mounting holes in order to facilitate the mounting of the awning assembly 10 to a mounting surface.

5 The awning assembly 10 further includes a roller tube assembly 18 having a roller tube 20 attached to a top surface of the horizontal truss brace 14. In an alternate embodiment of the present invention, the roller tube 20 can be attached to the first support leg 12a and the second  
10 support leg 12b, and the horizontal truss brace 14 can be eliminated.

A first glide rail 22a and a second glide rail 22b are attached to an inner side of and extend along a portion of the vertical length of the first support leg 12a and the  
15 second support leg 12b, respectively. The first glide rail 22a is adapted to allow a first glide block 24a to slide along the first glide rail 22a, and the second glide rail 22b is adapted to allow a second glide block 24b to slide along the second glide rail 22b. These glide rails can be  
20 integral to the support legs or made as a separate piece.

Alternately, the guide rails may be in the form of a grooved arrangement within the support legs.

In this embodiment, the awning assembly 10 further includes a first glide block ribbon 25a having a first end  
5 attached to the first glide block 24a and a second end attached to the roller tube 20. In a substantially similar manner, the awning assembly 10 further includes a second glide block ribbon 25b having a first end attached to the second glide block 24b and a second end attached to the  
10 roller tube 20. The first glide block 24a and the second glide block 24b in combination/cooperation with each other and the first glide block ribbon 25a and the second glide block ribbon 25b serve as a raising lowering mechanism. It should be understood that other raising/lowering mechanisms  
15 may be used to raise and lower the first glide block 24a and the second glide block 24b instead of the first glide block ribbon 25a and the second glide block ribbon 25b used in this embodiment. Other raising/lowering mechanisms that may be used to raise and lower the first glide block 24a and the  
20 second glide block 24b could include, for example, the use

of tapes, cords, chains, screw drives, either alone or in combination, or the like.

The awning assembly 10 further includes a first end of a first front arm 26a and a first end of a first rear arm 28a attached to opposing sides of the first glide block 24a via hinged attachment points. A first end of a second front arm 26b and a first end of a second rear arm 28b are attached to opposing sides of the second glide block 24b via hinged attachment points. A second end of the first front arm 26a and a second end of the second front arm 26b are attached to opposite ends of a front bar 30a, ideally in a semi or completely rigid manner. In a substantially similar manner, a second end of the first rear arm 28a and a second end of the second rear arm 28b are attached to opposite ends of a rear bar 30b, ideally in a rigid manner. Although they may be hinged at one or more of their endpoints, the first front arm 26a, the second front arm 26b, the first rear arm 28a, and the second rear arm 28b are preferably constructed in such a manner that they are rigid (i.e. not hinged) along their entire length. This eliminates a potential point of

failure of conventional awning arms that may have one or more articulations positioned in or along their length.

The front bar 30a and rear bar 30b may additionally be provide with slots for the attachment of a front valance 33a  
5 and rear valance 33b, respectively. The awning assembly 10 further includes a front canopy material 32a, comprised of a flexible material such as fabric or plastic, having a first end attached to the front bar 30a and a second end attached to the roller tube 20. In a substantially similar manner,  
10 the awning assembly 10 includes a rear canopy material 32b having a first end attached to the rear bar 30b and a second end attached to the roller tube 20. The front canopy material 32a and rear canopy material 32b are adapted to provide protection against sunlight, rain, etc. when in a  
15 deployed configuration as illustrated in FIGURE 1.

Referring now to FIGURE 2, a plan view of the frame assembly of the awning assembly 10 of FIGURE 1 is illustrated.

Referring now to FIGURE 3A, an embodiment of the roller  
20 tube 20 of FIGURE 1 is illustrated. The roller tube 20 includes a mechanism for attaching of the front canopy



material 32a to the roller tube 20, ideally this can be a first slot 21 extending along the length of the roller tube 20 for attachment of the front canopy material 32a and the rear canopy material 32b. The roller tube 20 is adapted to  
5 allow the front canopy material 32a and the rear canopy material 32b to be wound and unwound around the roller tube 20 at a single point of attachment.

Referring now to FIGURE 3B, another embodiment of the roller tube 20 of FIGURE 1 is illustrated. The roller tube  
10 20 includes a mechanism for attaching of the front canopy material 32a to the roller tube 20, ideally this can be a first slot 21 extending along the length of the roller tube 20. The roller tube 20 further includes a includes a mechanism for attaching of the rear canopy material 32b to  
15 the roller tube 20, ideally this can be a second slot 23 extending along the length of the roller tube 20. The roller tube 20 is adapted to allow the front canopy material 32a and the rear canopy material to be wound and unwound around the roller tube 20 at attachment points on opposing  
20 sides of the roller tube 20. Although slot arrangement(s)

are shown in FIGURES 3A and 3B, other attachment methods could be employed.

Referring now to FIGURE 3C, an alternate embodiment of the roller tube assembly 18 of FIGURE 1. The roller tube assembly 18 of FIGURE 3C includes two counter rotating rollers consisting of a first counter-rotating roller tube 35a and a second counter-rotating roller tube 35b. In this embodiment the front canopy material 32a is attached to the first counter-rotating roller tube 35a, and the rear canopy material 32b is attached to the second counter-rotating roller tube 35b. Accordingly, during extension and retract of the front canopy material 32a and the rear canopy material 32b, the first counter-rotating roller tube 35a and the second counter-rotating roller tube 35b rotate in directions counter to each other. Additionally, in yet another embodiment, the two rollers need not be counter-rotating.

Referring now to FIGURE 4, an embodiment of the front bar 30a of FIGURE 1 is illustrated. The front bar 30a includes a front arm slot 40a for attachment of the first front arm 26a and the second front arm 26b. The front bar

30a further includes at least one of a first slot 42a, and second slot 44a, and a third slot 46a for selective attachment of the front canopy material 32a and the front valence 33a. For example, in one embodiment, the front  
5 canopy material 32a may be attached to the front bar 30a at the third slot 46a, and the front valence 33a may be attached to either one of the first slot 42a or the second slot 44a in accordance with whether it is desired to have a portion of the front bar 30a visible or covered by the front  
10 valence 33a. It should be understood that the rear bar 30b of the present invention can be constructed in a manner that is substantially similar to that of the front bar 30a.

It should be understood that other configurations of the front bar 30a and rear bar 30b could be used. Although a  
15 slot arrangement for the attachment of the front canopy material 32a and/or front valence 33a is shown in FIGURE 4, other attachment methods could be employed. For example, an alternate embodiment of the front bar 30a can be used such that the front canopy material 32a and the front valence 33a  
20 are attached to the front bar 30a using fasteners and/or adhesive material.

Referring now to FIGURES 5A-5C, a front view, a side view, and a top view, respectively of an embodiment of the first glide block 24a of FIGURE 1 is illustrated. The first glide block 24a may be constructed of a hollow steel tube 50a having a substantially rectangular cross section. The first glide block 24a further includes, for example, a steel pipe 52a attached to an inner surface of and oriented along an axis extending from a top to a bottom of the hollow steel tube 50a. The first glide block 24a further includes, for example, a fiberglass pipe 54a in contact with an inner surface of the steel pipe 52a in order to allow the first glide block 24a to slide along the first glide rail 22a. In one embodiment of the first glide block 24a one or more bolts can be used in order to secure the attachment of the steel pipe 52a to the inner surface of the hollow steel tube 50a. The second glide block 24b may be constructed in a substantially similar manner to that of the first glide block 24a.

Referring now to FIGURE 6A-6C, the awning assembly 10 of FIGURE 1 is illustrated in various stages of deployment. The awning assembly 10 operates such that as the roller tube

20 is rotated so as to deploy the canopy, each of the first glide block ribbon 25a and second glide block ribbon 25b, used as an exemplary raising/lowering mechanism, are wound around the roller tube 20, resulting in the first slide block 24a and second glide block 24b being pulled in an upward direction along the first glide rail 22a and the second glide rail 22b, respectively. Simultaneous with the winding of the first glide block ribbon 25a and second glide block ribbon 25b around the roller tube 20, the front canopy material 32a and rear canopy material 32b are unwound from the roller tube 20. A hinged movement of the first front bar 26a and second front arm 26b as the first glide block 24a and second glide block 24b move upward results in the outward movement of the front bar 30a thereby deploying the front canopy material 32a into its fully extended position. In one embodiment of the present invention, the hinged attachment of the first front arm 26a and the second front arm 26b to the first glide block 24a and the second glide block 24b may optionally be spring loaded such that outward pressure is placed upon the first front arm 26a and the

second front arm 26b to facilitate the extension of the front canopy material 32a.

In addition, as each of the first glide block 24a and second glide block 24b are pulled upward, the hinged movement of the first rear arm 28a and second rear arm 28b results in the outward movement of the rear bar 30b thereby deploying the rear canopy material 32b into its fully extended position. In one embodiment of the present invention, the hinged attachment of the first rear arm 28a and the second rear arm 28b to the first glide block 24a and the second glide block 24b may be optionally spring loaded such that outward pressure is placed upon the first rear arm 28a and the second rear arm 28b to facilitate the extension of the rear canopy material 32b. The extension of the front canopy material 32a and the rear canopy material 32b results in the formation of a protective canopy.

When it is desired to return the awning assembly to its fully retracted position, the roller tube 20 is rotated in a counter direction to that of extension. As the roller tube 20 is rotated in the counter direction, the front canopy material 32a and the rear canopy material 32b are wound

around the roller tube 20. In addition, the first glide  
block ribbon 25a and the second glide block ribbon 25b are  
unwound from the roller tube 20 as the roller tube 20 is  
rotated in the counter direction, resulting in the downward  
5 movement of the first glide block 24a and the second glide  
block 24b along the first glide rail 22a and the second  
glide rail 22b, respectively.

A variety of suitable mechanisms may be used to rotate  
the roller tube 20 in order to facilitate the retraction and  
10 extension of the awning assembly 10. For example, a hand  
crank located along an outer surface of one of the first  
support leg 12a and the second support leg 12b having a worm  
gear attachment to the roller tube assembly 18 may be used  
such that a user may rotate the hand crank in alternate  
15 directions in order to extend or retract the awning  
assembly. In another example, a electric motor can be used  
to rotate the roller tube 20 in opposing directions in order  
to alternately extend and retract the awning assembly 10.  
These mechanisms can be linked to the raising/lowering  
20 mechanisms or can be independent of them.

Referring now to FIGURE 6A, a side view of the awning assembly 10 of FIGURE 1 is illustrated in a fully retracted position. In the fully retracted position of the awning assembly 10, the first glide block 24a is positioned at the lowest point of its movement along the first glide rail 22a and the first glide block ribbon 25a is substantially unwound from the roller tube 20. The first front arm 26a and first rear arm 28a are folded into an upright position, and the front canopy material 32a and rear canopy material 32b are substantially wound on the roller tube 20.

Referring now to FIGURE 6B, a side view of the awning assembly 10 of FIGURE 1 is illustrated in a partially extended position. In the partially extended position of the awning assembly 10, the first glide block 24a has been moved upward along the first glide rail 22a by the first glide block ribbon 25a being partially wound on the roller tube 20. The first front arm 26a and the first rear arm 28a have move outward into a partially extended position, and the front canopy material 32a and the rear canopy material 32b are partially unwound from the roller tube 20.



Referring now to FIGURE 6C, the awning assembly 10 of FIGURE 1 is illustrated in a fully extended position. In the fully extended position of the awning assembly 10, the first glide block 24a has moved upward to the highest point along the first glide rail 22a, and the first glide block ribbon 25a is substantially wound on the roller tube 20. The first front arm 26a and the first rear arm 28a are extended outward at their fullest extension, and the front canopy material 32a and the rear canopy material 32b are substantially unwound from the roller tube 20. It should be understood that the term "extension" as discussed in regard to the first front arm 26a and the first rear arm 28a is meant to refer to the lifting of the first front arm 26a and the first rear arm 28a by the first glide block 24a, and the resulting increase in the angle of the first front arm 26a and first rear arm 28a with respect to the first support leg 12a, during deployment of the front canopy material 32a and the rear canopy material 32b. The term "extension" as discussed in regard to the first front arm 26a and the first rear arm 28a is not meant to refer to an increase in the length of the first front arm 26a and the first rear arm 28a

during deployment of the front canopy material 32a and the rear canopy material 32b.

Referring now to FIGURE 7A, a perspective view of a portion of the awning assembly 10 of FIGURE 1 is illustrated. In FIGURE 7A is illustrated a portion of the first support leg 12a, a portion of the first front arm 26a, a portion of the first rear arm 28a, a portion of the first glide block ribbon 25a, a portion of the first glide rail 22a, the first glide block 24a, and the first base plate 16a when the awning assembly 10 is in a fully retracted position.

Referring now to FIGURE 7B, another perspective view of a portion of the awning assembly 10 of FIGURE 1 is illustrated. In FIGURE 7B is illustrated a portion of the first support leg 12a, a portion of the first front arm 26a, a portion of the front bar 30a, a portion of the first glide block ribbon 25a, a portion of the horizontal truss brace 14, a portion of the first curved truss brace 15a, and a portion of the roller tube 20 when the awning assembly 10 is in a fully retracted position.

Referring now to FIGURE 7C, still another perspective view of a portion of the awning assembly 10 of FIGURE 1 illustrated. In FIGURE 7C is illustrated a portion of the first support leg 12a, a portion of the first front arm 26a, 5 a portion of the first rear arm 28a, a portion of the first glide block ribbon 25a, a portion of the first glide rail 22a, the first glide block 24a, and when the awning assembly 10 is in an extended position.

Referring now to FIGURE 8, an embodiment of the present 10 invention having an integrated misting device is illustrated. FIGURE 8 illustrates a plan view of the frame assembly of the awning assembly 10 in accordance with an alternate embodiment of the present invention in which a misting device 60 is affixed to the horizontal truss brace 15 14. A supply hose 62 having a first end connected to the misting device 60 and a second end connected to a source of liquid, such as water, supplies the liquid to the misting device 60 so that it may be dispensed in the form of a mist, thus providing cooling to persons positioned under the 20 awning assembly 10.

Referring now to FIGURE 9, an embodiment of the present invention in which the awning assembly 10 is affixed to a table 70 is illustrated. The embodiment of FIGURE 9 provides an integrated table and awning assembly such that persons seated or standing at the table 70 may be provided with protection by the canopy, while also providing for more compact storage when not in use. The table 70 may also be provided with wheels and/or a handle to aid in the movement of the table 70 and awning assembly 10. Further, the table 70 can act to eliminate use of the optional first base plate 16a and second base plate 16b shown in FIGURE 1.

Referring now to FIGURE 10, a perspective view of an awning assembly 110 having a canopy material 132a in accordance with another embodiment of the present invention is illustrated. The awning assembly 110 illustrated in FIGURE 10 includes a frame assembly comprised of a right support leg 112a and a left support leg 112b attached to and supporting a second horizontal truss brace 114. A first curved truss brace 115a and a second curved truss brace 115b may be further attached between the right support leg 112a and the horizontal truss brace 114, and the left support leg

112b and the second curved truss brace 115b, respectively, to provide additional support. A first base plate 116a is attached to the right support leg 112a and a second base plate 116b is attached to the left support leg 112b in order to provide increased stability to the awning assembly 110. In one embodiment, the first base plate 116a and second base plate 116b can further be provided with mounting holes in order to facilitate the mounting of the awning assembly 110 to a mounting surface. Alternately, the awning assembly 110 can be mounted in an offset manner to a vertical surface, such as the side of a recreational vehicle, and the left support leg 112a and the right support leg 112b would not need to extend to the ground, but merely would have to extend to the closed position. In still another embodiment, the first glide rail 22a and the second glide rail 22b can be mounted directly to the vertical surface and the left support leg 112a and the right support leg 112b can be omitted. The awning assembly 110 further includes a roller tube assembly 118 having a roller tube 120 attached to a top surface of the horizontal truss brace 114.

A first glide rail 122a and a second glide rail 122b are attached to an inner side of and extend along a portion of the vertical length of the right support leg 112a and the left support leg 112b, respectively. The first glide rail 5 122a is adapted to allow a first glide block 124a to slide along the first glide rail 122a, and the second glide rail 122b is adapted to allow a second glide block 124b to slide along the second glide rail 122b. The awning assembly 110 further includes a first glide block ribbon 125a having a 10 first end attached to the first glide block 124a and a second end attached to the roller tube 120. In a substantially similar manner, the awning assembly 110 further may include a second glide block ribbon 125b having a first end attached to the second glide block 124b and a 15 second end attached to the roller tube 120.

The awning assembly further includes a first end of a first arm 126a attached to the first glide block 124a via a hinged attachment point. A first end of a second arm 126b is attached to the second glide block 124b via a hinged 20 attachment point. A second end of the first arm 126a and a second end of the second arm 126b are rigidly attached to

opposite ends of a front bar 130a. The front bar 130a may additionally be provided with a slot for the attachment of a valance 133a.

The awning assembly 110 further includes canopy  
5 material 132a, comprised of a flexible material such as fabric or plastic, having a first end attached to the front bar 130a and a second end attached to the roller tube 120.

It should be understood that other raising/lowering mechanisms may be used to raise and lower the first glide  
10 block 124a and the second glide block 124b instead of the first glide block ribbon 125a and the second glide block ribbon 125b used in this embodiment. Other raising/lowering mechanisms that may be used to raise and lower the first glide block 124a and the second glide block 124b include the  
15 use of tapes, cords, chains, screw drives or the like.

Although a preferred embodiment of the method and apparatus of the present invention has been illustrated in the accompanying Drawings and described in the foregoing Detailed Description, it is understood that the invention is  
20 not limited to the embodiment disclosed, but is capable of numerous rearrangements, modifications, and substitutions

without departing from the spirit of the invention as set forth and defined by the claims.